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SCIENCE NEWS-LETTER

The Weekly Summary of Current Science

A SCIENCE SERVICE PUBLICATION

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MOUNDBUILDER RETURNS

Sits in Case in Ohio State Museum

(See page 52)

Vol. XVIII No. 485

Bones Bear Out Evolution Prediction

Paleontology

New Extinct Horse Fills Gap Left by Scientists

FOSSIL bones of a new species of extinct horse, discovered in Idaho by J. W. Gidley of the U. S. National Museum, have made an evolutionary prediction good, just as the recently found planet Pluto made an astronomical prediction good.

When paleontologists arranged all the fossils of the many extinct horse species in the order of their geologic age, some years ago, it was found that they also fell into a structural order. They showed graded series of characters that fairly shouted "evolution." Most notable were the step-like increase in size, and the decrease in the number of toes from five in the little Eohippus to one in the modern horse.

There were three gaps in the series, however, and scientists predicted from the characters of the species on either side of each gap what the animal would be like that filled it when it was finally discovered. Two of the gaps have now been filled, Mr. Gidley's find constituting a new species of the genus immediately below the modern, one-toed horse.

The skeletons and skulls of the horses found by Mr. Gidley were buried in what seems to have been a bog-hole in a watercourse. There was a great mass of plant material along with the bones, consisting principally of leaves and twigs of trees, of species as yet unidentified. It is unusual to find fossil plant and animal remains in the same place, for the conditions required for their preservation are not always alike. In the present instance, the plant remains influenced the character of the fossils, for the bones from the lower part of the pit are darkly stained with bog-iron, leached out of the leaves.

Other animal remains found in the pit with the horse skeletons represent a species of giant peccary or wild hog, a large beaver, a mastodon, an animal that is probably a badger, an otter-like animal, turtles, frogs and fish. Outside the pit but in the same neighborhood and in the same geological horizon Mr. Gidley found a small mastodon, only seven or eight feet high, and a cat about the size of a small mountain lion. Both of these may be new species.

In addition he found bones of two species of camel, one of them about the same size as the modern camel and the other much longer-legged and longer-necked. There were also bones of a small sloth, of the giant peccary, and of beavers, pocket gophers and field mice.

Science News-Letter, July 26, 1930

Poison From Rice

A POISONOUS substance known as lyso-lecithin has been found in ordinary polished rice by a Japanese investigator, Dr. Motoe Iwata, working at the biochemical laboratory of the Institute of Physical and Chemical Research in Tokyo.

The poisonous substance was only obtained after repeated extraction with alcohol, so that it could hardly have any effect on human beings through ordinary consumption of the cereal. However, it may have some relation to the factor in polished rice which causes the nervous disease, beri-beri. This will be investigated later, Dr. Iwata said.

Beri-beri has previously been thought due to absence of vitamin B in polished rice, when the latter has been the chief food of affected persons.

Chemistry

Science News-Letter, July 26, 1930

The Answer Is

In This Issue

Why is the recent discovery of a *two-toed ancestor* of the modern one-toed horse important? p. 34—How does a Russian scientist make soil fertile *without fertilizer?* p. 51—Where did the *moundbuilders* of America come from? p. 52—What did Samuel F. B. Morse have most difficulty with when *inventing* the telegraph? p. 54—What is Dr. Henry Fairfield Osborn's reason for the *rarity of fossils* of primitive man? p. 56—How might mustard gas *prevent cancer?* p. 56—Is *sea level* on the Atlantic coast *rising* to engulf the land? p. 57—What event that will last *only 92 seconds* is causing a party of scientists to make a trip half way around the world? p. 58—Can you buy a *million insects* for $10? p. 58—Where are *eels* that live in Asia, Africa and Australia born? p. 61.

A Year For a Gram

BECAUSE of a year's delay in obtaining radium for the Marie Curie Radium Institute of Warsaw, for which Madame Curie was given $50,000 in 1929 by a group of Americans, the hospital will not be able to open its doors until December.

The delay has had its advantages, however, for the interest on the money will be sufficient to purchase platinum screens for the radium when it becomes available. Madame Curie said that the demand for radium was now so great that the producers are far behind in filling their orders.

Only one gram is required for the Warsaw hospital, and although it was ordered last November when Madame Curie returned with the purchase money, its delivery will require another five months.

Medicine

Science News-Letter, July 26, 1930

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Bacteria—Chief Chemists of the Soil

Soil Science

Scientists Tell of Their Work at Congress in Russia

Russia, with the Great Bear's share of the land of two continents, is naturally a land (or rather a group of lands) of many soil types. With its great population dependent primarily on agriculture and the forest industries, it is to be expected that soil science should play an important part in the effort that is being made since the Revolution to place Russian living on a more comfortable material basis. Soil scientists in Russia are among the foremost in their field, and their colleagues in other lands are agreed that it is highly appropriate for the Second International Congress of Soil Science to be held in Leningrad and Moscow. Herewith are presented reports on a few of the many papers read there during the past week.

EVERY plant that sends its roots down into the soil gathers to itself a great crowd of microscopic hangers-on, like the vassals around a baron of old. It greatly promotes the growth of soil bacteria, and to a less degree it encourages fungi and other soil microbes. Studies of this condition were reported this week before the Second International Congress of Soil Science at Leningrad, by Prof. Robert L. Starkey of the New Jersey Agricultural Experiment Station.

Plants seem to produce a substance or substances through their roots, that bacteria find available for their needs, for the microorganisms grow thickest in immediate contact with the roots and are much scarcer a fraction of an inch away, Prof. Starkey found.

Rapidly Growing

BACTERIA are the chief chemists of the multiplex changes of material that are constantly going on in the soil. We have begun to understand their work, but our understanding so far is only a beginning, and soil microbiology is on the threshold of a development that will dwarf all present accomplishments in that field.

These were among the ideas presented by Prof. Selman I. Waksman of the New Jersey Agricultural Experiment Station. Prof. Waksman's paper summed up the present status of soil microbiology, with special stress on recent developments.

While soil microbiology is rapidly growing up into an independent branch of science, its future still depends on its continued contact with its parent sciences, Prof. Waksman emphasized. General bacteriology and the study of the fungi, on the one hand, and soil chemistry on the other, will both make large contributions to its development and recieve new growth themselves from the data which it will produce.

Desert Soil Bacteria

NITROGEN-FIXING bacteria are active even in the arid soils of the desert, Prof. P. S. Burgess of the Arizona Agricultural Experiment Station told his fellow soil scientists.

These nitrogen-capturing microbes are usually thought of as being active only in soils where higher plants leave something for them to feed on; but Prof. Burgess found that in the desert soils there were enough algae, free-living one-celled plants, to supply at least part of the foodstuffs needed by the bacteria. The bacteria are able to thrive also in the presence of rather high concentrations of alkali.

Rejuvenation

PROF. S. KRAVKOV, a Russian soil scientist, told his colleagues that he has developed a method for restoring fertility to apparently exhausted soils without the use of fertilizers.

It consists of keeping the soil to be treated under optimum physical conditions, especially as regards temperature, moisture and aeration, while the natural microbiotic population builds up and captures nitrogen from the air. Prof. Kravkov stated that he had increased the nitrogen content of "podsol," a poor, gray soil found in certain forest lands, approximately tenfold by his method.

Sulfur as Fertilizer

SULFUR must take its place on the list of approved fertilizer minerals, at least for certain types of land. Such is the indication of experiments performed by Prof. W. L. Powers of the Oregon Agricultural Experiment Station.

Prof. Powers has attacked the problem of black alkali, one of the most hopeless types of land ruin in the arid and irrigated West. He found that applications of sulfur, especially when used in combination with a nitrogen-rich organic fertilizer, will reclaim such land and make it yield good crops.

Even normal land is often benefited by sulfur application, he found. Sulfur-treated fields produced higher yields of alfalfa, which had a richer, greener growth than that of the unsulfured fields.

Antagonistic Iron

IRON in the soil has a constant tendency to break up aluminum compounds it finds there and set the aluminum adrift. This is indicated by experiments of Dr. J. S. Joffe of the New Jersey Agricultural Experiment Station.

Analyses of river waters showed that ordinarily they contain more aluminum than iron. In an endeavor to learn how this comes about, Dr. Joffe added a soluble iron compound to samples of soil, and found that in the solutions he got out again the iron had decreased in concentration, having been captured and held by the soil, accompanied by a release of aluminum. But when soil containing a good deal of iron had a soluble aluminum compound added, it did not lose any of the iron.

Showing Up Lime

TO find out how little lime there is in the soil, find out how much iron there is in the plants that grow on it.

This, in rough outline, is the field method of soil analysis used by Prof. Oscar Eckstein of Berlin, and described by him.

It is not of much practical value, Prof. Eckstein said, to determine by analysis the total calcium content of a soil. Not all the calcium in it is available to plants, and it is only the available calcium that really counts. But it has been learned that there is an antagonism between calcium and iron, and when a plant gets too little calcium it is very apt to take up an excess of iron. Iron in a plant stem can be detected very easily, by means of several (*Turn to Page 62*)

Did The Moundbuilders Come From Mexico?

Archæology

By Frank Thone

WERE the Indians who built the mysterious mounds of the great interior valley of our country kinsmen to the Mayas of Yucatan and the other highly cultured peoples of the Mexican plateau?

Are the decidedly Maya- and Aztec-like sculptures taken from mounds in the Southeast really witnesses to an evolution from the same racial stock and an inheritance of the same art traditions, rather than just evidences of an ancient commerce with the countries across the Gulf of Mexico?

Dr. H. C. Shetrone, director of the Ohio State Museum at Columbus and one of the most active investigators of Indian mounds in America, thinks it not unlikely that the vanished people who built the great earthen monuments came as a great wave of migration from the south. They deployed over the Mississippi valley, overran the Gulf coastal plain southward to peninsular Florida, they penetrated to the Great Lakes region. They developed several different cultures, or types of civilization, as they spread abroad through the great land that was open to them, and the outer edges of the spreading wave became less and less like the original comers in their ways of living, while the group nearest the ancient homeland remained more like the stay-at-home descendants of their own forefathers.

Scientific Modesty

This in brief is Dr. Shetrone's hypothesis. It is set forth (with due tentativeness and modesty, after the fashion of a scientist when he has something startling to say) along toward the end of a new book which he has written and which will be off the press in a short time.

That the moundbuilders in all probability had some sort of contact with the high civilizations to the south is believed now by practically all students of American antiquity. In several mounds, particularly in the southeastern states, elaborately worked figures in sheet copper, shell, and other materials have been found, in a workmanship that strongly suggests the conventions of Mayan and Aztec art. The favorite subject is a full-panoplied brave (or possibly a god) doing a war-dance. His regalia is decidedly like that of some of the figures in Mexican sculptures, and what is even more suggestive, he holds in one hand a severed human head, presumably the gory trophy of an enemy. And in addition to these lively figures of human beings, there are other conventional designs that also bear a notable resemblance to the great though grotesque art of the southern lands.

Another suggestion that the moundbuilders and the Mayas had a common inheritance is found in the occasional effigy of plumed rattlesnake discovered in the Southeast. The plumed serpent was a favorite religious emblem of the Mayas; it symbolized their great sun-deity. Its images in stone dominate the architectural decorations of the temples at Chichen Itza and the other great cities of the ancient Yucatecan civilization. And although the cult of the Serpent was not so highly developed among the Aztecs, some of their temples do show highly elaborated rattlesnake images. The snake dances among the Indians of our own Southwest may be a survival of the same cult, and an indication of how the gap between Yucatan and Alabama was bridged.

There are further resemblances between the culture of the moundbuilders and that of the Mexican area. Another noted American archaeologist, Prof. Warren K. Moorehead, of Phillips Academy, has made a list of them. He mentions especially the building of flat-topped pyramids or temple mounds. For many of the earthen mounds in this country, especially in the South, have flat tops, and once had religious structures, probably of wood, built on them. It is worth noting that the so-called pyramids of the Mayas, Aztecs and other Mexican nations were not solid stone pyramids like those of the Egyptians, but were built of earth and covered with stone. They were really stone-plated mounds, rather than true pyramids.

This ceremonial blade, seventeen inches long, was made from a block of obsidian carried from the Yellowstone region to Ohio. It was found beneath one of the Hopewell mounds.

Another thing which the moundbuilders and the Mexican peoples held in common was the wearing of large spool-shaped ear ornaments of copper. In several different types of mounds, presumably built by different tribes and possibly at widely different times, these somewhat ponderous pieces of jewelry have been found. In Dr. Shetrone's own particular pet mounds in Ohio, of the type known as Hopewell, these ear-spools have been turned up by thousands. Apparently everybody wore them. And ear-spools of almost identical pattern adorn the heads in Mexican sculptures and appear on the carved figures found in Alabama mounds.

There is considerable similarity also in two types of the ceremonial

objects which probably played a large part in the religious ritual of the mound peoples and certainly did in the rituals of the Mexican nations. These are one-piece axes made of stone, handle and all, and tremendously large chipped stone blades. Neither of these two types of implement could have been of any practical use, for the knives are much too large for either tools or weapons, and a stone ax is much more serviceable if it is tied on a wooden handle.

Volcanic Glass From Afar

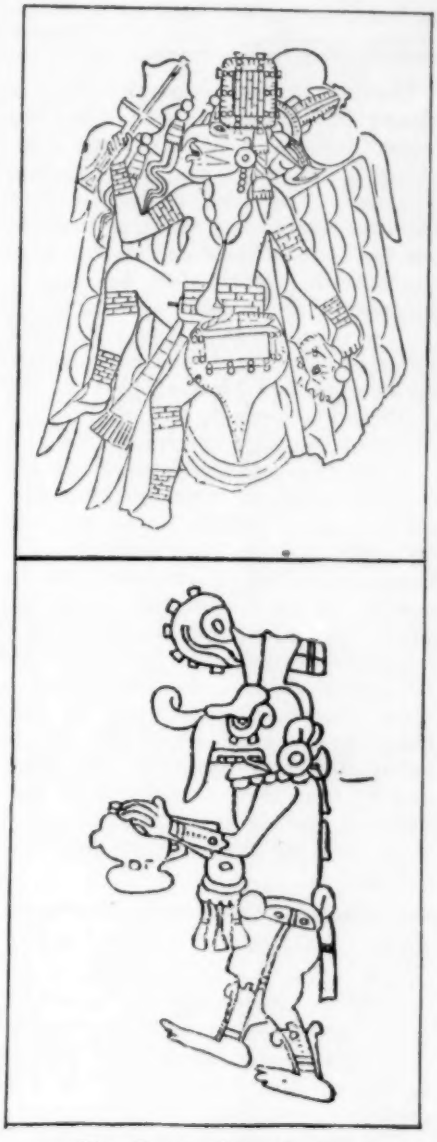
The trouble to which the Hopewell moundbuilders went to get obsidian, or volcanic glass, for their big ceremonial blades is possibly an outstanding example of this religious conservatism. Hundreds of these beautifully chipped blades have been taken from mounds in Ohio, and bushels upon bushels of flakes knocked off in their manufacture.

All the hundreds of pounds of obsidian for making these had to be carried on human backs for long distances. The nearest source of this shining black volcanic glass is Obsidian Cliff in Yellowstone National Park. There is no doubt that much of the Hopewell obsidian came from this place—perhaps most of it—although some of the pieces are chemically and physically more like obsidian found at a still greater distance, in the Southwest.

This insistence of the moundbuilders in Ohio and the upper Mississippi valley on just this one kind of stone, obsidian, even though they had to make long and toilsome journeys to get it, is well worth noting. For obsidian was the material favored for ceremonial blades by the Aztecs and their forerunners on the Mexican plateau. In that volcanic region it is relatively easy to get, and therefore a natural thing to use. If it is only a coincidence that a people in the remote middle valley of the continent would be willing to go to such trouble to get this same material for the same purpose, the coincidence is most remarkable, to say the least.

These parallels in the cultures of eastern North America and the Mexican area by no means exhaust the list, but they are sufficient to indicate at least that the moundbuilders and the Mexicans were not strangers to each other.

Dr. Shetrone strongly disclaims any theory that the moundbuilders started from Mexico with their culture already fully developed, and merely transplanted themselves and their mode of living into the northern land, as the Europeans did centuries later. On the contrary, his hypothesis supposes a people at a relatively early stage of development, who left the parent stock in the homeland and journeyed northward and then toward the east, bringing with them the germs of the culture which they later evolved and diversified in their own ways as they spread out into the great land they found before them, while their kinspeople at home also evolved and diverged in a different direction. This would account for the great differences to be found among the moundbuilders themselves, and between them and the historic Mexican nations, while allowing for the striking similarities that persisted.



The figure above is from a copper plate found at Etowah, Georgia; the lower one is from the Mayan Codex. Each bears a severed human head in one hand, wears elaborate headdress, beak-like nose-mask, ear-spools. Is this genetic relationship or chance resemblance?

But let Dr. Shetrone tell the story in his own words.

"Although several theories have been advanced as to the route of entry into America of the Asiatic migrants, all others, including the Polynesian Islands, the mythical Atlantis, and the Aleutian Islands, have been abandoned in favor of the only logical and easy point of access—Bering Strait," he says. "At its narrowest the Strait is but sixty miles in width, with the Diomede Islands, midway of the channel, visible under favorable conditions from either shore. Human curiosity, it is pointed out, would of itself be sufficient incentive to provoke a crossing, and the migratory instinct would hardly recognize in the undertaking any serious obstacle. Moreover, it is conceivable that the Strait at that remote time may have been wholly or partly frozen over, thus affording an ice bridge. This significant migration from the Old World to the New, however, is believed not to have been an enterprise begun and completed within a comparatively short time. Continuous bands of migrants, under venturesome leaders, presumably continued to cross the Strait throughout centuries of time, as the great continents to the southward received and absorbed their first human inhabitants. . . . .

The Moundbuilders' Ancestors

"Of the subsequent dispersals and migrations of these primitive immigrants only sufficient need be recounted to indicate their connection with those interesting peoples who, centuries later and after generations of wandering, were to become the so-called Mound-builders. Dispersal from the first appears to have been both to the east and to the south. Although the rugged mountain ranges paralleling the Pacific Coast imposed a barrier to the eastward, certain bands were able to find their way across in favorable localities. From these hardy adventurers it seems plausible to trace the historic Indian stocks and (*Turn to page* 62)

American Electromagnetic Telegraph —A Classic Invention

Electricity

IMPROVEMENT IN THE MODE OF COMMUNICATING INFORMATION BY SIGNALS BY THE APPLICATION OF ELECTROMAGNETISM. Samuel F. B. Morse, of New York, N. Y. Specification forming part of Letters Patent No. 1,647, dated June 20, 1840. U. S. Patent Office.

To all whom it may concern:

BE it known that I, the undersigned, SAMUEL F. B. MORSE, of the city, county, and State of New York, have invented a new and useful machine and system of signs for transmitting intelligence between distant points by the means of a new application and effect of electro-magnetism in producing sounds and signs, or either, and also for recording permanently by the same means, and application, and effect of electromagnetism, any signs thus produced and representing intelligence, transmitted as before named between distant points; and I denominate said invention the "American Electro-Magnetic Telegraph," of which the following is a full and exact description, to wit:

It consists of the following parts —first, of a circuit of electric or galvanic conductors from any generator of electricity or galvanism and of electro-magnets at any one or more points in said circuit; second, a system of signs by which numerals, and words represented by numerals, and thereby sentences of words, as well as of numerals, and letters of any extent and combination of each, are communicated to any one or more points in the before-described circuit; third, a set of type adapted to regulate the communication of the above mentioned signs, also cases for convenient keeping of the type and rules in which to set and use the type; fourth, an apparatus called the "straight port-rule," and another called the "circular port-rule," each of which regulates the movement of the type when in use, and also that of the signal-lever; fifth, a signal-lever which breaks and connects the circuit of conductors; sixth, a register which records permanently the signs communicated at any desired points in the circuit; seventh, a dictionary or vocabulary of words to which are prefixed numerals for the uses hereinafter described; eighth, modes of laying the circuit of conductors.

The specifications for the original Morse telegraph bring to mind the latest automatic self-printing telegraph instruments just now coming into use. The chief problem to the inventor seems not to have been to get his code of dots and dashes over the electric circuit, but to send it as exactly as possible and to get it into written form at the other end. For this purpose it was actually set up in a special kind of type at the sending instrument, and the jagged edges of the type run under the key, so that the make-and-break of the current occurred with machine precision. Most of the patent is taken up with minute specifications for these outmoded accessories and for a now familiar recording device for the receiving instrument. The earliest telegraph instruments were provided with these devices, and the operators were themselves surprised to find that they soon learned the rhythmical dot-dash language so thoroughly that they translated as they listened, and the recording pen merely slowed up telegraphic communication.

The circuit of conductors may be made of any metal—such as copper, or iron wire, or strips of copper or iron, or of cord or twine, or other substances—gilt, silvered, or covered with any thin metal leaf properly insulated and in the ground, or through or beneath the water, or through the air. By causing an electric or galvanic current to pass through the circuit of conductors, laid as aforesaid, by means of any generator of electricity or galvanism, to one or more electro-magnets placed at any point or points in said circuit, the magnetic power thus concentrated in such magnet or magnets is used for the purposes of producing sounds and visible signs, and for permanently recording the latter at any and each of said points at the pleasure of the operator and in the manner hereinafter described—that is to say, by using the system of signs which is formed of the following parts and variations, viz.

Signs of numerals consist, first, of ten dots or punctures, made in measured distances of equal extent from each other, upon paper or any substitute for paper, and in number corresponding with the numeral desired to be represented. . . .

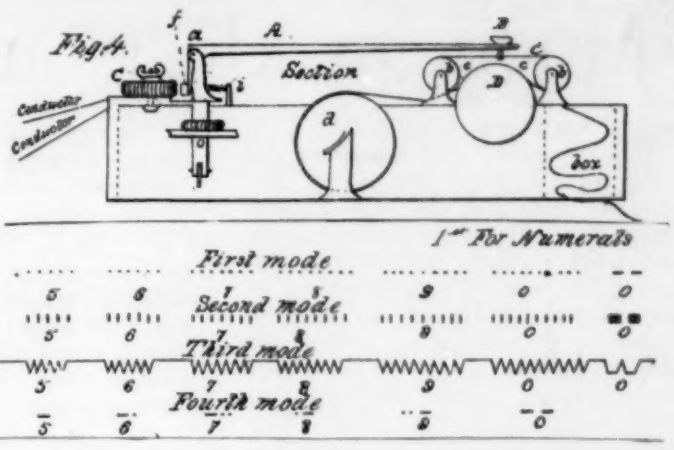
Signs of numerals consist, secondly, of marks made as in the case of dots, and particularly represented on the annexed drawing. . . .

Signs of numerals consist, thirdly, of characters drawn at measured distances in the shape of the teeth of a common saw by the use of a pencil or any instrument for marking. The points corresponding to the teeth of a saw are in number to correspond with the numeral desired to be represented, as in the case of dots or marks in the other modes described, and as particularly represented in the annexed drawing.

Signs of numerals consist, fourthly, of dots and lines separately and conjunctively used as follows, the numerals 1, 2, 3, and 4 being represented by dots, as in Mode 1, first given above: The numeral 5 is represented by a line equal in length to the space between the two dots of any other numeral; 6 is represented by the addition of a dot to the line representing 5; 7 is represented by the addition of two dots to said line; 8 is represented by prefixing a dot to said line; 9 is represented by two dots prefixed to said line; and 0 is represented by two lines, each of the length of said line that represents the number 5; said signs are particularly set forth in the annexed drawings. . . .

Either of said modes are to be used as may be preferred or desired and in the method hereinafter described. . . .

The type for producing the signs of numerals consists, first, of fourteen pieces or plates of thin metal,



The Morse Telegraph and code, from the drawings accompanying the patent specifications, showing tape for recording messages.

such as type-metal, brass, iron, or like substances, with teeth or indentations upon one side or edge of ten of said type, corresponding in number to the dots or punctures or marks requisite to constitute the numerals respectively heretofore described in the system of signs, and having also a space left upon the side or edge of each type, at one end thereof, without teeth or indentations, corresponding in length with the distance or separation desired between each sign of a numeral. . . .

The Instrument

The signal-lever consists, first, for use with the straight port-rule, of a strip of wood of any length from six to twenty-four inches, resting upon a pivot, *a*, or in a notched pillar formed in a fulcrum by a metal pin, *a*, passing through it and the lever. At one end of the lever a metallic wire, bent to a semicircular or half-square form, as at A, or resembling the prongs of a fork distended, is attached by its center, as described in the annexed drawings. Between said end of the lever and the fulcrum *a*, and near the latter, on the under side of the lever A, is inserted a metallic tooth or cog, *b*, curved on the side nearest to the fulcrum, and in other respects corresponding to the teeth or indentations upon the type already described. On the opposite extremity of the lever is a small weight, C, to balance or offset, in part, when needed, the weight of the lever on the opposite side of the fulcrum. The lever thus formed is stationed directly over the railway or groove D D, heretofore described as forming a connected part of the straight port-rule. The movement of the type-rule brings the tooth of each type therein set in contact with the tooth or cog of the lever, and thereby forces the lever upward until the points of the two teeth in contact have passed each other, when the lever again descends as the teeth of the type proceeds onward from the tooth of the lever. This operation is repeated as frequently as the teeth of the type are brought in contact with the tooth of the lever. By thus forcing the said lever upward and downward the ends of the semicircular or pronged wire are made alternately to rise from and fall into two small cups or vessels of mercury, E E, in each of which is an end or termination of the metallic circuit-conductors, first described above. This termination of the metallic circuit in the two cups or vessels breaks and limits the current of electricity or galvanism through the circuit; but a connection of the circuit is effected or restored by the falling of the two ends of the pronged wire A attached to said lever into the two cups, connecting the one cup with the other in that way. By the rising of the lever, and consequently the wire upon its ends, from its connection with said cups, said circuit is in like manner again broken, and the current of electricity or galvanism destroyed. To effect at pleasure these two purposes of breaking and connecting said circuit is the design of said motion that is imparted in the before-mentioned manner to said lever, and to regulate this motion, and reduce it to the system of intelligible signs before described, is the design and use of the variations in the form of the type, also before described. A plate of copper, silver, or other conductor connected with the broken parts of said circuit of conductors, and receiving the contact of wire attached to said lever, may be substituted, if preferred, for said cups of mercury. . . .

The Register

The register consists, first, of a lever of the shape of the lever connected with the circular port-rule above described, and is delineated in the annexed drawings. . . . Said lever A operates upon a fulcrum, *a*, that passes through the end that forms the elbow *a*, upon the lower extremity of which, and facing an electro-magnet, is attached the armature of a magnet, *f*. In the other extreme of the lever, at B, is inserted one or more pencils, fountain-pens, printing-wheels, or other marking-instruments. . . .

Secondly, of a cylinder or barrel of metal or wood, and covered with cloth or yielding coating, to turn upon an axis and occupying a position directly beneath the pencil, fountain-pen, printing-wheel, or other marking-instrument to be used. Two rollers, marked *b b* in said figure of drawings, are connected with said cylinder, on the upper-side curvatures thereof, and being connected with each other by two narrow bands of tape passing over and beneath each. . . . The distance between said bands of tape on the rollers is such as to admit of the pencil, or other marking instrument in the lever, to drop upon the intervening space of the cylinder.

The Wire Circuit

The modes which I propose of insulating the wires or other metal for conductors, and of laying the circuits, are various. The wires may be insulated by winding each wire with silk, cotton, flax, or hemp, and then dipping them into a solution of caoutchouc, or into a solution of shellac, or into pitch or resin and caoutchouc. They may be laid through the air, inclosed above the ground, in the ground, or in the water. When through the air they may be insulated by a covering that shall protect them from the weather, such as cotton, flax, or hemp, and dipped into any solution which is a non-conductor, and elevated upon pillars. When inclosed above the ground they may be laid in tubes of iron or lead, and these again may be inclosed in wood, if desirable. When laid in the ground they may be inclosed in iron, leaden, wooden, or earthen tubes, and buried beneath the surface. Across rivers the circuit may be carried beneath the bridges, or, where there are no bridges, inclosed in lead or iron, and sunk at the bottom, or stretched across, where the banks are high, upon pillars elevated on each side of the river.

Reason for Rarity

"THE ancestors of man were the most clever of all animals and, therefore, the first to avoid natural burial and fossilization."

This ingenious explanation of the rarity of fossils of the higher anthropoid apes and the still greater rarity of fossils of the earliest types of primitive man is put forth by Dr. Henry Fairfield Osborn, president of the American Museum of Natural History. Because of the skill of our remotest ancestors in avoiding the overwhelming natural disasters that have furnished us with vast collections of the bones of less intelligent animals, it may be necessary to continue the search for pre-human fossils for several generations before an adequate amount of paleontological data on human origins will be available.

Dr. Osborn deplores the manner in which parts of his address on evolution at Des Moines last winter have been seized upon by partisan thinkers to make it appear that he had repudiated the main doctrine of evolution.

"Disloyalty to the main features of Darwin's theory of the descent of man is unthinkable," he said.

Paleontology

Science News-Letter, July 26, 1930

Keep Candles Down

WEATHERMEN in California must stop sending up tallow candles in balloons.

This order, that sounds like a belated effort toward a "safe and sane" Fourth of July, is really seriously meant, and is aimed at the prevention of forest fires. The worst fire season in the West comes during the later summer, when the forest floor is dry as tinder and there is no hope of rain for weeks.

Weathermen wishing to learn the direction and velocity of winds aloft send up small drifting balloons, and watch them through theodolites as they sail away. At night, to make the balloons visible, they hang little lanterns containing tallow candles under them, and keep the sighting-hairs of their instruments on these tiny points of light as they climb up toward the stars.

But it occurred to some one to ask what became of these candles when the balloons rose into the thin upper air, burst, and sent their collapsed remains hurtling toward the earth. It was easily possible that the candles, protected within their lanterns, would still be burning at the end of their fall; and if they happened to fall on the tinder-like forest floor—Well, the ukase went forth in short order that there were to be no more night balloons sent up until some less dangerous illuminant could be attached.

Aviators want these night reports on the state of the winds aloft, and they are waiting hopefully for some flashlight manufacturer to come forth with a light battery and bulb that will supersede the tallow candle, give them their night guides, and still leave the forests in safety.

Meteorology—Forestry

Science News-Letter, July 26, 1930

Cancer Preventive

MUSTARD gas, dreaded weapon of the World War, has been reported as possibly preventing and curing a number of diseases. The latest peacetime development of this gas is the announcement by the British Empire cancer campaign that it may prevent cancer in areas of the skin which have been painted with tars that ordinarily produce cancers

This does not in any way mean that mustard gas will cure cancer. Even its preventive action is extremely limited. But recent investigations may lead to a more general preventive method, it is said.

The starting point for the experiments leading to this discovery may have been the reported British observation that none of the British soldiers who were exposed to mustard gas in the war ever developed cancer, it has been suggested. German experiments along similar lines have also been reported.

Previously mustard gas had been heralded as a cure for locomotor ataxia, and other war gases were tried as cures for colds, tuberculosis, and various respiratory diseases.

Mustard gas is a sulfur compound, dichlordiethyl sulfide. Recently a Philadelphia scientist, Dr. Frederick S. Hammett, suggested that control of cancer might be gained by means of another sort of sulfur compound. He did not claim to have found any cure for the disease. However, he did state that transplantable tumorous growths in mice had been made to diminish and in at least one case to disappear altogether by the application of an organic compound containing partially oxidized sulfur.

Medicine

Science News-Letter, July 26, 1930

IN VARIOUS CI

Fast Recovery

A NEW method of treating carbon monoxide poisoning with ultraviolet rays brings quicker relief to the patient than ordinary methods of treatment, according to results of a test reported by Dr. Koza of Pressburg.

Carbon monoxide produces its poisonous effect by combining with the hemoglobin of the blood, displacing the oxygen which the body's tissues need and which they get from the blood. Some Italian observers had already found that when blood hemoglobin which was combined with carbon monoxide was irradiated with ultraviolet light, the carbon monoxide disappeared in from 30 to 60 minutes.

Dr. Koza worked on the theory that a considerable part of the blood is in the small blood vessels of the skin. Massage of the skin would stimulate the circulation in these blood vessels and let the ultraviolet rays go deep enough to reach the blood and drive out the carbon monoxide.

He tried this method on two sisters who were brought to the hospital because of carbon monoxide poisoning. One sister was treated by the new method, the other by the usual methods for overcoming carbon monoxide poisoning. At the end of 40 minutes the first sister had lost half the deadly gas from her blood but the other sister had only lost one-quarter of it. The first sister regained consciousness after nine hours, the second after 18 hours.

Medicine

Science News-Letter, July 26, 1930

Want Mercury Uses

A PRIZE of 5,000 pounds sterling, approximately $25,000, is being offered by the European producers of mercury for the inventor and exploiter of a new use for mercury or its salts which will increase the consumption of mercury as much as 1,000 flasks during 1930. To qualify, the new use must be as yet unknown to industry and must be patented not before January 1, 1930, in Germany and the United States.

Information regarding the prize can be obtained from Mercurio Europeo, Bureau de Repartition, Plaza St., Francois 5, Lausanne, Switzerland.

Chemistry

Science News-Letter, July 26, 1930

S CIENCE FIELDS

Sword Swallowers

SOME French physicians have examined the throats of sword swallowers with X-rays and the esophagoscope, the American Medical Association has just reported. The doctors found that in these men the lining of the esophagus, which is the tube leading from throat to stomach, was slightly swollen and very red. However, it did not show any signs of recent or old injuries.

By means of the fluoroscope, which makes use of X-rays, the doctors were able to watch the sword being swallowed all the way into the esophagus. This performance, which seems to be most hazardous, really is very simple and if it is done adroitly the performer is in no danger of injury, the doctors found.

Another interesting fact observed was that the sword swallowers breathed differently from most people. Their breathing was done exclusively by movement of the ribs, without any movement of the diaphragm. This was true of their normal breathing when they were not performing their act, as well as of the breathing while swallowing the sword.

Evidently a special physiologic predisposition, either natural or acquired, is necessary for success in sword swallowing.

Medicine

Science News-Letter, July 26, 1930

New Brain Duty

EXPERIMENTS showing a direct connection between the center of optical function and the skin, which is the organ of tactile impressions, have been reported by Prof. J. G. Dusser de Barenne of Utrecht University pharmacological institute. The experiments also showed the existence of a sense function of the visual organ outside of its optical functions.

Till now the thalamus opticus has been regarded as the organ of vision exclusively. The nervous effect caused by direct or reflected light on the eye travels along the optic nerve into the brain where in the thalamus opticus the visual picture is seen. Destruction of this portion of the brain results in incurable blindness, albeit the optical apparatus may be intact.

Working on cats, Prof. de Barenne injected by means of a specially constructed microinjector a few drops of a weak solution of strychnine sulphate colored with toluidine. The astonishing result of these injections is the development of areas on the skin of extreme sensitiveness to pain and other stimuli. They are most marked on the side of the body opposite to the injected part of the thalamus, and on extremities like the ears.

Medicine

Science News-Letter, July 26, 1930

$50,000 in Butterflies

THE U. S. National Museum will soon be the richer by the addition of one of the greatest collections of butterflies in the world, the famous William Barnes collection, now housed in a special building at Decatur, Ill. It was offered to the U. S. Government for $50,000, and the appropriation bill was recently passed and signed.

Dr. William Barnes, one of the great surgeons of the Midwest, was also an accomplished naturalist, having been a student under Louis Agassiz. He became interested in American butterflies and moths, and devoted much of his time for fifty years to the building up of one of the largest, and easily the most completely identified, collections on this continent. He not only spent his own time on the work, but employed trained entomologists to assist him, and also gathered a very considerable library.

The approximately half-million mounted insects, together with the library and Dr. Barnes' notes, will be housed in the New National Museum building.

Entomology

Science News-Letter, July 26, 1930

Petrified Wood

A PIECE of petrified wood from Yellowstone National Park, so perfectly preserved that even the finest microscopic details are practically as clear under the high-power lens as those of modern wood, is described and illustrated in the American Journal of Botany by Prof. H. S. Conard of Grinnell College.

It was found in a region where the only previously described petrified woods were those of redwood trees.

Paleobotany

Science News-Letter, July 26, 1930

Changing Sea Level

IS the average sea level of the Atlantic Ocean slowly but steadily rising so as to engulf land along the coast?

Fresh discussion of this question has been aroused by the publication by the National Research Council of a bulletin on mean sea level, written by Prof. Douglas Johnson of Columbia University. This bulletin contains a record made over a long period of years of the level of the sea at Fort Hamilton, N. Y., near New York City. Prof. Johnson interprets the figures as indicating that, while the sea level varies greatly from year to year due to weather changes and changes in the outline of the coast, there is no appreciable, progressive change. In other words, if your seaside property becomes submerged, the fault is not with a gradually sinking continent.

However, Prof. Alfred C. Lane and Prof. William F. Cheney, Jr., of Tufts College, disagree with Prof. Johnson's conclusion. Using the same data, but a different method of mathematical computation, they deduce that the sea level is rising at an average rate of one foot in 214 years.

Geophysics

Science News-Letter, July 26, 1930

Flowering Sahara

NEW evidence that the Sahara desert was once a well-watered, fertile region is presented by a small fossil found by an African expedition of the Logan Museum of Beloit College now being studied by University of Chicago scientists. The specimen is the skeleton of a cane-rat, a beast about the size of a woodchuck, which in present times is found only in thickets along the banks of streams in the more fertile parts of central Africa.

The new fossil, to be known as "Logan's cane-rat," appears to be extinct, but the conditions of the find indicate that it is not to be assigned to any remote geological period. The fossil comes from a region known as the Tanezrouft, now one of the dryest and most inhospitable parts of the central Sahara, 500 miles from the nearest flowing stream. The presence there of such an animal indicates that at the time at which it lived (probably only a few thousand years ago), the center of the Sahara was a well-watered country.

Paleontology

Science News-Letter, July 26, 1930

To Tin Can Island For 92 Seconds

Astronomy

"It Will End On The Day Before It Starts"

Few people would be willing to go to the trouble of a trip half way around the world on the possible chance of seeing something that will last only 92 seconds. But to the astronomer, to whom the fleeting moments of a total eclipse are of the utmost value, such a journey is not unusual. A champion eclipse observer tells here about his next trip, to be in October. He will visit an island that gets its mail once a month, thrown in a tin can from a passing steamer.

TO "Tin Can Island," a tiny bit of land in the south Pacific Ocean, a party of American astronomers will soon be en route, in order to observe a 92-second eclipse that will be visible there on the morning of October 21.

Speaking recently under the auspices of Science Service through a nation-wide network of the Columbia Broadcasting System, Dr. Samuel A. Mitchell, director of the Leander McCormick Observatory and ranking scientific member of the party, told of the plans for the observations. Though the expedition has been organized by the U. S. Naval Observatory, several other civilian astronomers are members of it.

One peculiar feature of the eclipse is that it will end on the day before it starts. Professor Mitchell explained this paradox as follows:

"The eclipse begins on October 22 by the time kept in Australia and Asia. After crossing the 180th meridian the eclipse by change of date takes place on October 21 by the time kept in the United States. Totality takes place in the middle of the forenoon and lasts 92 seconds."

The Only Place

Professor Mitchell told why a little inaccessible island in the South Seas has been selected as the site for scientific observations of the phenomenon.

"Across the thousands of miles of waters of the Pacific Ocean there is only one small island from which the eclipse may be observed," he said. "This is the island of Niuafou of the Tonga group which lies about mid-way between the Samoan Islands and Fiji. The Tonga Islands are under the protection of Great Britain.

"The eclipse island generally goes by the familiar but uneuphonious name of Tin Can Island, not because goats thrive there but rather for the reason that the island is volcanic with precipitous banks. There are no indentations in the shore line big enough to make a bay, so it is impossible to keep a boat on the island. The southeast trade winds usually blow and these kick up such a sea that landing on the island from a boat would usually be quite out of the question.

"Hence for these reasons, when once a month the inter-island steamer goes by carrying the mails, the letters and papers for the island are sealed up in a tin can and are dropped overboard. Two natives swim out from shore with a small raft on which is the outgoing mail, also in a tin can. The exchange of tin cans is effected—and the island slumbers on peacefully for another month awaiting the arrival of the mail boat.

"The island is about three miles in diameter, shaped like a gigantic signet ring, with an interior lake of brackish water lying nearly 100 feet above sea-level. About 1000 to 1500 natives of the Polynesian race inhabit the island and two or three white traders. The chief trade is in the products of the cocoanut which here grows unusually large.

"A year ago the island was visited by a devastating volcanic eruption which practically wiped out a native village but fortunately with no loss of life. We are told that volcanic eruptions visit the island on the average of only once in every fifteen years. We have faith in these scientific predictions and we have no fears that on the day of the eclipse our observations will be ruined by such disturbances."

Astronomers From New Zealand

Besides the American party, a group of astronomers from New Zealand will travel to Niuafou to take advantage of the 92 seconds of totality. The scientific observations to be made include photographs of the corona, the sun's outer layer which is visible only at eclipse time, through a camera 63 feet long. This will be operated by Dr. Ross W. Marriott, of Swarthmore College.

Other corona pictures will be made with smaller instruments, while photometric measurements will be made of the brightness of the eclipse. Prof. Mitchell himself will be mainly interested in photographing the flash spectrum, or the spectrum of the last sliver of the sun to be seen before the moon covers it and the first to reappear when totality is over.

The astronomers will travel by regular steamers to Pago-Pago in American Samoa, and from there the mine-sweeper, U. S. S. "Tanager," will carry them and their instruments the remaining 300 miles. Comdr. C. H. J. Keppler, U. S. N., will be in administrative charge, so as to leave the astronomers free to devote their entire energies to scientific work.

A Million Insects for Ten Dollars

Entomology

TEN dollars a million for insects! Who'll buy?

The average stung, bitten and beitched picnicker or camper may ask wearily why anybody should want to buy a million insects at that price when you get more than a million for nothing every time you show your nose out of doors.

But the insects that are worth ten dollars a million are cheap at the price, for they prey on the eggs of other insects, thereby preventing the pests from ever seeing the light. They are the almost microscopic wasps known as *Trichogramma*, which are reared in captivity by Stanley E. Flanders, entomologist of the Citrus Experiment Station at Riverside, California.

Mr. Flanders has been at this work for some time now, and has improved his rearing methods to a point where the tiny parasites can be produced at a thousand for a cent. They are shipped out in great numbers to orchardists, who release them to assist in their endless warfare on fruit-spoiling insect pests.

Mosquitoes' Tastes For Food Learned

Entomology

They Like Sweetened Water Better Than Blood

MOST suffering humans have the very natural opinion that mosquitoes do not need any coaxing or compulsion when it comes to eating, but medical entomologists who want to study the ways of the pestiferous insect that carries malaria germs know otherwise.

Anopheles, the malaria mosquito, seems to be quite willing to take an uninvited meal at all sorts of inconvenient times, but turns coy in the laboratory, so that sometimes the malaria patients and uninfected volunteers have to wait for hours before the insect makes up her mind to sink in her bill.

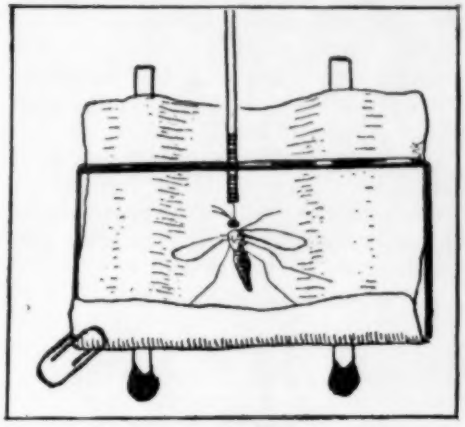
Now, however, two Russian scientists, Drs. N. Kadletz and L. Kusmina, have devised a method for forcibly feeding malaria mosquitoes, so that henceforth much time and many itches may be saved. They report their experiments in the German scientific journal, *Die Umschau.* They imprison a captured mosquito between a slip of thin glass or cellophane and a fold of soft paper, tightly enough to hold her but not so tightly as to break any legs or wings. Then they slip an exceedingly fine glass tube over her proboscis, and by this means feed her on any liquid they wish to try out. In a large percentage of cases the captive mosquito will begin pumping as soon as the liquid comes into contact with her mouthparts.

Can Be Fooled

This forcible feeding method makes it possible to try out many other things besides blood, and thus to study the mosquito's food prefereces, her digestive reactions and her susceptibility to various poisons.

One of the first results of the experiments was the interesting discovery that mosquitoes like syrups better than they do blood. In one "run," the insects consented to drink in 90 per cent. of all tries with sweetened water, but took blood in only 48 per cent. This indicates, in the opinion of Drs. Kadletz and Kusmina, that the preferred diet of even female mosquitoes may after all be plant nectars and saps, and that they develop ogreish appetites only on occasion.

Mosquitoes can be fooled, too. Glycerin, which has no food value, apparently tastes sweet to them just as it does to us, for they drink it as though it were a syrup. But when they do, it does not seem to have the same reaction in the digestive tract, for only the crop, or front part of the tube, becomes filled, whereas when blood or a salty bouillon is fed the whole abdomen swells.



How a mosquito is held while being forcibly fed through a capillary tube.

Hibernating Mosquitoes

Tests were made with hibernating mosquitoes. Some of the insects store up fat like bears in summer, and like bears they live on their fat while they doze the winter through. If such hibernating mosquitoes are roused by warming, most of them will refuse to feed, even if their beaks are left in the feeding tube for a long time. But some of them will accept syrup or blood; and this willingness of a few of the hibernators to take a meal may explain the occasional mysterious attacks of malaria that occur in winter when there are supposedly no mosquitoes around.

When offered unknown fluids, mosquitoes react differently, according to the nature of the stuff in the tube. They can be tricked into drinking poisons, such as formalin, quinine and corrosive alkalies, as if they were ordinary water. But they will not take any kind of ethereal oil, even in the smallest quantity. Syrups which the insects had previously drunk with eagerness were flatly refused when a trace of clove oil was added.

Science News-Letter, July 26, 1930

Esperanto Congress

SCIENTISTS and others interested in the development and use of a universal auxiliary language for international correspondence and meetings will soon gather here for the 22nd Universal Congress of Esperanto to be held in connection with an Esperanto Summer University from August 2 to 9.

Language experts from Paris, Liverpool, Rome, and Budapest will lecture at the summer university on evolution of languages, music, European vocabularies, and special attractions at the congress will be a display of national dances and special theatrical performances.

Language

Science News-Letter, July 26, 1930

No Better Milk From Sun-Bathed Cows

Physiology

SUN-BATHS for cows may have advertising value, but experimental evidence shows that milk from sun-bathed cows does not have the power to prevent rickets, which our enthusiastic belief in sunshine might suggest. A group of scientists at the University of Wisconsin report in a recent journal the findings of a series of experiments which show rather conclusively that "daily exposure of cows to sunlight has little if any effect upon the antirachitic potency of milk."

The flavor and general quality of summer-produced butter has suggested to scientists as well as to laymen that there may also be a difference in the vitamin value of milk from cows which have been in sunlight and those which have been kept in a barn all the time.

Vitamin D prevents rickets by promoting the formation of calcium phosphate in bones. Animals, both human and otherwise, obtain vitamin D either from food or from the action of sunlight upon their bodies. The source of the vitamin D which the cow puts into her milk is of greatest importance. It is especially necessary that cows get this particular vitamin, since babies are (*Turn to next page*)

so completely dependent upon milk for their supply of this rickets-preventing vitamin.

Early investigators in the field of vitamins were inclined to believe that milk from sun-bathed cows showed greater promotion of bone growth. The stronger evidence, according to the Wisconsin investigators, points to the fact that "well recognized superior quality of summer-produced butter and milk must have its primary origin in other factors than sunlight acting directly upon the cows." The authors state that in all of their experiments "no improvement in milk or butter fat secretion was observed."

E. M. Luce, another scientist working in this field, is quoted by the authors as concluding from experiments that any antirachitic properties of milk depended not upon the amount of sunlight the cows had, but upon their diet. This knowledge is of vital importance to the owners of dairy herds, especially those whose dairies supply the milk for thousands of city children, whose chance at sunlight is pretty small.

It is not sufficient that cows have sunlight. They must be fed rations which contain vitamin D ready made, in order that their milk may keep children from having rickets.

Science News-Letter, July 26, 1930

Ass and Ostrich Still Wild in Syria

Zoology

THE wild ass and his sons still scamper and bray in the Syrian desert. And wild ostriches still make their nests about the ruins of the once proud Greco-Roman city of Palmyra.

A recent expedition into the Syrian hinterland, sent out by the Hebrew University of Jerusalem, has determined that these animals still exist, and has brought back to headquarters a number of other species new to science. The scientific personnel of the expedition consisted of I. Aharoni, zoologist, M. Zohary, botanist, Miss F. Eckmann, parasitologist, and George Halil Tahan, hunter.

It was found that although the wild ass, mentioned in the Bible, has become extinct over a large part of his former range, he may still be found on a long, narrow strip of territory stretching from Mosul toward Persia.

The Syrian ostrich was seen in the vicinity of Palmyra, and three of its eggs were purchased from an Arab. They were smaller than other ostrich eggs, and Mr. Aharoni is of the opinion that the birds may turn out to be a distinct subspecies.

Another prize brought back by the expedition consists of two fine skeletons of the cheetah, or hunting leopard. This animal is domesticated and used like a hunting dog in some parts of Asia, but these particular specimens were hunting "on their own" too near a flock of sheep. They were shot by a French official of the Syrian mandate, M. Paul Clerc, and presented by him to the Hebrew University.

Many smaller animals were observed and collected. Of one rare species, the Syrian squirrel, three living and thirteen dead specimens were brought in. This little animal seems to be a communist, for colonies of five or six of them will store nuts and other food supplies in a common cache in a hollow tree.

Small birds were also investigated by the expedition. One occurrence vividly illustrated the literal accuracy of the verse in the Book of Proverbs: "The eye that mocketh at his father . . . the ravens of the valley shall pluck it out." A wounded magpie had been captured, and was placed near an owl, also injured. The magpie promptly tried to pluck out the owl's eyes. Mr. Aharoni states that this bird always attacks the eyes first.

Science News-Letter, July 26, 1930

Sugar for Asthma

A NEW method for treating asthma which makes use of sugar, has just been reported.

Dr. Arnold Osman, medical assistant, Guy's Hospital, London, has been able to render children free from asthma by simply adding sugar to the diet without any other treatment.

He has recently described four typical cases of bronchial asthma which have been treated in this way and have been free from attacks for periods of one to two and a half years. The sugar was administered in the form of glucose in lemonade three times daily in between meals, and extra cane sugar was also given at meal times. In each case there was marked improvement in the general health and spirits as well as complete disappearance of the asthma. Unfortunately this simple remedy is of no use in adult cases of asthma.

In view of the supposed connection between eczema and asthma in children, Dr. Osman tried the effect of sugar treatment in cases of infantile eczema. Here again it was beneficial. Glucose added to the feeds or given in lemonade rapidly cured infantile eczema.

Medicine

Science News-Letter, July 26, 1930

820-lb. Meteorite Falls in Arkansas

Astronomy

AN 820 pound stony meteorite that fell a few months ago near Paragould, Ark., is the largest meteoric stone whose fall was observed and which has been recovered intact, announces Dr. C. C. Wylie, professor of astronomy at the University of Iowa, in an article in the forthcoming issue of *Science*. The large stone is now in the Field Museum in Chicago.

When it fell it seemed to burst into three pieces, at a height of about five miles. A second piece, weighing about 80 pounds, has been recovered, and Dr. Wylie suggests that a third piece may yet be discovered.

The large stone struck in a pasture and went down in rather stiff clay to a depth of a little over eight feet, he says. When the meteorite burst, it produced an explosion heard over a great area, while at points hundreds of miles distant it was interpreted as an airplane accident.

The only larger stone meteorite was one that fell at an unknown date at Long Island, Kansas. This one weighed more than 1,200 pounds, but it broke upon striking on a rocky ledge.

Many iron meteorites are known which are much larger. The biggest in a museum is one which Peary discovered in Greenland. It is now in the American Museum of Natural History in New York and weighs 36½ tons. A still larger one was discovered a few years ago in South Africa, but has not been removed from the site of its fall. Still larger, probably, was a meteorite, or, more likely, a swarm of them that fell in Siberia in 1908 and produced an air wave that was recorded on a sensitive barometer in England. The famous Meteor Crater in Arizona, about a mile across, is also supposed to have been caused by a huge meteorite or meteoric swarm which fell several thousand years ago.

Science News-Letter, July 26, 1930

South Sea Birthplace of Eels Found

Zoology

A STURDY little steamer, of only 360 tons, and 138 feet in length, recently berthed at Copenhagen, Denmark, after a record voyage for a ship of her class. The *Dana* had been all the way around the world, via the Panama Canal, many stops in the South Seas, and the Cape of Good Hope, since she weighed anchor in June, 1928.

The object of her long voyage was eels. The scientific expedition she carried was in command of Dr. Johannes Schmidt of the University of Copenhagen, who a few years ago made himself famous by solving the age-old riddle of where eels breed. He found that the freshwater eels of both Europe and America go to the middle of the Atlantic ocean to lay their eggs, and that they never return to their river homes, the young finding their way unguided.

The present expedition made a similar discovery about the eels of southern Asia, eastern Africa, parts of Australia and some of the oceanic islands. There are six species of eels in their rivers, and five of them go to a spot in the middle of the Indian Ocean to breed. Like their Atlantic relatives, the parent eels never return, and the young ones, or elvers, sort themselves out and find their way back to their proper waters by some instinct or set of reactions of which we are as yet in complete ignorance.

The *Dana* was originally a British boat, built for service in the North Sea, and purchased by the Danish government in 1921.

Science News-Letter, July 26, 1930

Thinking Insects

Entomology

CAN an insect think? Even while it is an infant in its cradle?

Dr. Frank E. Lutz, of the American Museum of Natural History, has added to the stock of perplexing riddles of insect behavior by a series of experiments performed on the larvae of caddis flies. These infant insects have shown an adaptiveness in their behavior that in some instances looks as though it contained an element of deliberate choice.

Caddis flies are somewhat primitive insects, whose larvae live in the water. They make a cocoon-like case in which they live. The case is spun of silky threads, and in most species is reinforced with various foreign objects which the larva picks up and builds into its walls. Some species use bits of twigs and leaf-stems exclusively; others, living in swifter waters, use small pebbles and grains of sand.

Dr. Lutz deprived a number of larvae of their cases and then put them in vessels of water with building-materials to which they were not accustomed. He gave the steam-users only sand and pebbles and the pebble-users only stems and decayed leaves. Inasmuch as the ancestors of these insects had been using only their preferred materials for millions of years, the larvae were thus suddenly confronted with as severe a problem as though one were to transplant a Hottentot to Greenland and expect him to build a snow igloo.

The larvae met their problems and solved them, some responding readily, others more reluctantly. But they all built themselves new houses out of the unaccustomed materials. The stem-building species showed some signs of ancestral habit when they had to work with sand, for they chose the long, cylindrical particles formed from broken sea-urchin spines. But the sand-builders with nothing but leaves to use worked out an entirely new technique. They bit the leaves into suitably sized pieces and then worked these into the walls of their dwellings.

Science News-Letter, July 26, 1930

No Locust Danger

THERE appears to be no real danger that locusts will become a serious pest in Mexico at this time, is the belief of Dr. Alfons Dampf, in charge of technical investigations in pest control work of the Mexican Ministry of Agriculture. Locusts are swarming in Yucatan, but they always exist in that state, Dr. Dampf points out. In the fields they are fought with sprays and oil, while the brush in which they sometimes appear is burned. This type of locust hardly ever goes farther north in Mexico than the states of Jalisco and Nayarit.

Entomology

Science News-Letter, July 26, 1930

Special Sale of TAMI POCKET MICROSCOPES

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Tami Pocket Microscope with base removed to examine opaque objects

Widely used for botany, entomology, mineralogy, biology, chemistry, geology, and other general microscopic work. The objective is divisible. With the bottom objective lens (F) removed, the magnification ranges from 25x to 112x; whereas with bottom lens attached, magnifications range from 50x to 225x. The variation in magnifications is obtained by extending or collapsing the telescopic draw tubes.

Fine focusing is accomplished by turning the knurled collar (E).

Microscopic slides or other transparent objects are placed on the stage (A) for examination while larger and opaque objects are examined by removing the base (D) and placing the microscope directly over or on the object. Supplied with metal case 4 x 1¼ inches.

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Moundbuilders—*Continued*

nations of the Plains and the northern portions of the present United States and Canada. With these, the purpose of this volume is not much concerned, for they seem to have had but superficial connection with the moundbuilding peoples.

"Whether or not the southerly trend of migration was numerically more important than that to the eastward, certain it is that in eventual development it was more significant. Hemmed in by mountain barriers on the left flank and enticed by the salubrious climate and never-failing food supplies of the Pacific Coast, the streams of immigrants from across Bering Strait came after a while into Mexico and Middle America. Here, in a semi-tropical setting unfavorable to the more advanced planes of human civilization but eminently encouraging to the development from primitive to higher culture stages, they prospered. From wandering nomads they became sedentary agricultural peoples, able for the first time to face the future with adequate stores of food supplies against famine and pestilence; able to exist in compact populous communities and thus to develop community enterprise and specilization of labor. The magic key which unlocked the door to progress was nothing more nor less than maize or Indian corn. . . .

Seek New Homes

"Equipped with the rudiments of agriculture and with the confidence engendered thereby, and carrying the germ of culture generated during their sojourn in the parental area in Mexico, the American aborigines again succumbed to the instinctive urge to seek new homes and to explore unknown lands. Once more groups and bands followed venturesome leaders across the visible horizon, some of them retracing, in a way, the old migration trails of the northward. To afford the reader an appreciation of the manner in which numerous highly diversified tribes and peoples, under equally diversified phases of environment, developed from a common source or stock, and to lead him, without further delay, to the objective of our inquiry, the Moundbuilder area, a somewhat hypothetical but highly probable series of movements may be assumed. From the nuclear area in southern Mexico the line of migration may be followed northward, finding its first materialization in the arid region of the Southwest. Here, influenced definitely by environment, may be envisioned the development of the Pueblo culture. Taking advantage of natural shelters in the cliffs and utilizing the native clays for making sun-dried brick for the construction of communal dwellings, the Pueblo peoples develop in due time a culture complex, distinctive and outstanding. This, it may be assumed, represents the first step outward from Mexican influence, and, as would be expected, it contains more elements of the parent nucleus than any other outlying region. The second stage of migration is found, not to the northward, as might be expected, but eastward in what is termed the Southeastern Woodland area, corresponding to the southern half of the general mound area. This second stage of removal from the Mexican cultural center brings us definitely into the country of the Mound-builders, and completes the hypothetical connection between the Asiatic migrants at Bering Strait and the peoples with which this volume is concerned. From this Southeastern region migration may be assumed to have extended, by still another step or stage, to the northern half of the mound area; and, ascending the Mississippi, it appears to have influenced to some slight extent the Plains area adjacent to the Southeastern Woodland, west of the Mississippi."

Cultures Differed

It must not be thought that after the great dispersal which Dr. Shetrone envisages the moundbuilders maintained any kind of uniformity. Though never so numerous as the peoples of Europe, they were spread over a territory nearly as large as everything west of Russia, and they achieved a diversity of culture as great as that of western Europe. Their most elaborate civilization was that of the so-called Hopewell people in Ohio and westward to the Mississippi. Their towns were the Paris and Vienna of the moundbuilder world, and their ceremonial enclosures doubtless its Rome and its Canterbury. But there were at least two other distinct moundbuilder peoples in Ohio alone, and when all the different types of burial, religious, and dwelling-site mounds have been counted up and correlated with the artifacts found in and around them, there are easily a score of different moundbuilder "nations" recognizable.

In spite of all that has been said and written about the moundbuilders, the real scientific investigation of their story is only beginning. There are thousands of mounds that have never been explored, including even the largest of all, the great mound of Kahokia, Illinois, opposite St. Louis, which is bigger than the pyramid of Cheops.

Some of these have been set aside as state parks or otherwise protected.

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Bacteria—*Continued*

different chemicals that cause a change of color when it is present. So by this indirect method it is possible to determine whether or not there is sufficient calcium in a given piece of land.

Increasing Nitrates

SOIL nitrates, one of the most important classes of plant nutrients, are materially increased by the addition of other fertilizers in proper amounts. This is the central idea of a paper presented by Prof. A. B. Beaumont of Massachusetts Agricultural College.

The American scientist added graded amounts of various types of fertilizer to different kinds of soils, and tested for increase or decrease in nitrates. Lime, he found, increased the nitrate concentration, in amounts up to six tons of lime to the acre. Beyond that amount lime was not beneficial; in some cases large amounts depressed nitrification. Green crops plowed under checked nitrification for three or four weeks, but after that time nitrates again accumulated rapidly.

The addition of nitrate fertilizers naturally increased the amount of soil nitrates; but in some instances it was found that the natural reactions and biological activities in the soil increased the soil nitrates over the figure allowed for even in adding the nitrogen fertilizers. Only one non-nitrogenous fertilizer element, phosphorous, had a consistent tendency to decrease soil nitrification.

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NATURE RAMBLINGS

By Frank Thone

Mockingbird

THE South is favored in many ways. There are magnolias in the spring, for example, and heavy-odored jasmine flowers. In summer the indolent Spanish moss moves languidly on its live-oak branches, encouraging one in the praiseworthy art of waiting until tomorrow. It is better today to listen to the mockingbird.

The mockingbird is most especially something to be thankful for. Many other birds, most of them in fact, sing industriously during the mating and nesting seasons, and then shut off the supply. They give us plenty of a good thing—sometimes rather too much—during a utilitarian period, and then stop, almost abruptly.

Not so the mockingbird. He is an artist, and his song is not merely a means to a living but an end in itself. He will tinkle and coruscate and whistle his own scintillating music, and for variety ring in bits from the repertories of other birds, with catcalls and rusty-hinge squeaks by way of scherzo interludes. And he is apt to give us a recital at almost any time and for any reason or no reason at all.

Like all talented artists, he quickly learns the tricks of other artists. The late Edward Bok told a good story at his own expense. When he had built his bird sanctuary about his "singing tower" in Florida, he imported some European nightingales, hoping that they might become established there. Like all such experiments in the past, this one failed; nightingales somehow will not live in America. But even when all his exotic songsters had died, their songs still continued. The mockingbirds that had been their neighbors had learned them!

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Science Still Needs Martyrs

Medicine

OPPORTUNITIES to join the noble band of martyrs of science still exist. Those who would enroll their names in company with Lazear, Noguchi, Stokes and the rest may yet be called on by the investigators who are seeking to control human disease.

When Drs. William C. Finnoff and Phillips Thygeson of Denver reported on their recent trachoma studies, they concluded that it may be necessary to resort to experiments on human beings to prove finally whether or not they had identified the germ of this disease. Whether these human volunteers will be recruited from the ranks of the unemployed who may be paid for their martyrdom with the means of subsistence, or whether they will be drawn from condemned prisoners who may save their lives in order to sacrifice them for science and humanity, is a question for society to decide.

The Denver scientists have isolated a germ which they believe to be the cause of trachoma, dreaded eye disease prevalent among eastern mountaineers and Indians of the Southwest. This germ is similar to the one reported as the cause of trachoma by Dr. Hideyo Noguchi. So far the work has been done with monkeys, but the scientists are not satisfied that they really have the germ of the disease in humans.

"Because of the fact that trachoma in monkeys is not identical with that in human beings, it may be necessary to resort to human inoculations to prove or disprove conclusively the etiologic relationship of *Bacterium granulosis* to trachoma," they said.

From New Mexico comes reports that a Chinese convict, condemned to die, was told his sentence would be commuted if he would volunteer to be a subject for trachoma investigations. He refused.

More recently a jobless man, desperate, is reported to have offered himself to the scientists in the hope that he could gain a bare living for his starving wife. But the scientists had no funds to guarantee the wife's support, he found.

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FIRST GLANCES AT NEW BOOKS

DEATH VALLEY: THE FACTS—W. A Chalfant—*Stanford Univ. Press,* 155 p., $3.50. A few years ago the name "Death Valley" caused most of us to shudder. Only extremely hardy souls, very resistant to heat and desiccation, ever ventured into the place. With the coming of motor transportation, however, one can get into and out of such picturesque though forbidding places unscathed, even in comfort; and travel into Death Valley is becoming more common. Some day it will possibly be a national park. Against that fortunate time, and for the benefit of those who now frequent the valley, Mr. Chalfant has produced this book, giving the solid factual background around which all the earlier romantic writings have been embroidered.

General Science

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THIRTY FATHOMS DEEP—Commander Edward Ellsberg—*Dodd, Mead,* 266 p., $2. The diver whose skill raised the sunken submarines S-51 and S-4, exploits described in his previous book, "On the Bottom," turns his pen to fiction. A modern salvage ship sails in search of Spanish treasure lying thirty fathoms deep off the coast of Peru. After a battle with the ocean to recover the treasure, the treasure hunting crew fights modern pirates.

Fiction

Science News-Letter, July 26, 1930

NON-METALLIC MINERAL PRODUCTS—W. S. Bayley—*Holt,* 530 p., $4. A valuable text which will help make engineers of the future give more consideration to economic factors. It tells where and to what extent non-metallic minerals are found and how they are mined. Its importance can be judged by the fact that surveys show the value of non-metallic substances produced in the United States to be more than three times that of metallic substances.

Geology

Science News-Letter, July 26, 1930

PLANE AND SPHERICAL TRIGONOMETRY—R. D. Carmichael and E. R. Smith—*Ginn & Co.,* 198 p., $1.60. A text for students beginning plane and spherical trigonometry.

Mathematics

Science News-Letter, July 26, 1930

THE GLORIOUS OYSTER—Hector Bolitho—*Knopf,* 203 p., 6 s. A New Zealander here shows Englishmen how properly to appreciate oysters, and he brings to his aid legions of noble Roman trenchermen. It is a pity, though, that the author did not first come to this side of the water and eat his way around the coast, from the rockbound shores of Maine to the whispering shoals of the Gulf. Then he could have made an excellent book perfect, and still further glorified that which is already glorious.

Marine Zoology—Applied Gastronomy

Science News-Letter, July 26, 1930

HIGHWAYS HANDBOOK—(1929 Edition)—*Highway Education Board,* 95 p., 50c. Seldom are collections of bare facts and figures, however valuable they may be for reference, interesting to the casual examiner. The statistics and information on the highways of the world which this handbook contains are a striking exception.

Engineering

Science News-Letter, July 26, 1930

PILOTING YOUR LIFE—Joseph Jastrow—*Greenberg, 372* p., $3.50. The psychologist is often called upon to act as helmsman, to aid in steering individuals through the rough seas of life. Starting from this point of view, Dr. Jastrow writes of the psychic life of the individual from childhood into maturity, stressing the psychological problems and showing how the psychologist steers the individual away from the reefs and rocks. The book has grown out of the articles which Dr. Jastrow writes for newspapers, amplified and brought into a logical sequence; hence the volume is addressed very definitely to the average reader and deals with the problems which personally interest him.

Psychology

Science News-Letter, July 26, 1930

PRESSON BIOLOGY TESTS (I and II)—John M. Presson—*World Book Co.* ($1.20 per package of 25). Two series of standardized tests, of the single-word-answer type, designed to determine the completeness and accuracy of the secondary pupil's biological information. Test I covers plant biology, Test II animal and human biology.

Biology—Education

Science News-Letter, July 26, 1930

FIELD BOOK OF PONDS AND STREAMS—Ann Haven Morgan—*Putnam's,* 448 p., $3.50. This newest addition to the excellent series of pocket-size field books published by Putnam's gives us a comprehensive view of the life in and about freshwater bodies, and so cuts across all classes of animals and plants. Algae and submerged vascular plants, emersed plants of all kind, worms, molluscs, crustacea, insects and vertebrates all receive terse but adequate and well-illustrated treatment. Folk who go camping or "cottaging" beside still waters should as a rule take few books with them, but this is one book they should take.

Biology

Science News-Letter, July 26, 1930

CONDENSED CHEMICAL DICTIONARY—Edited by Francis M. Turner—Chemical Catalog Co.—*Little and Ives Co.,* 551 p., $10. Nearly everything chemical from A. H. Gum to Zymase is contained in this compact volume, now in its second edition, which can be kept conveniently on chemical reference shelves. Data on each chemical listed are given under the headings: Color and properties, constants, solubility, derivation, impurities, grades, containers, uses and railroad shipping regulations.

Chemistry

Science News-Letter, July 26, 1930

BEHAVIORISM, A BATTLE LINE—Edited by William P. King—*Cokesbury Press, Nashville, 376* p., $2.25. A symposium by 18 philosophers, psychologists, and theologians, discussing the mechanistic view of psychology and its implications. The introduction by Josiah Morse states that the volume is presented "with a view of furnishing an antidote to the behavioristic poison that has been spread so freely among the young." The contributors include: William McDougall, Bishop Francis McConnell, Rabbi Julius Mark, and Herbert C. Sanborn.

Psychology

Science News-Letter, July 26, 1930

SECOND INTERNATIONAL TECHNICAL RAW SILK CONFERENCE—(Proceedings)—*The Silk Association of America, Inc.,* 526 p., $5. The technical papers and discussions of the Second International Technical Raw Silk Conference held in New York last fall are contained in this volume.

Textiles

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